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of Devonian. Between the two are as of older rocks a tract of great extent, in the centre of the island, is occupied by coal-bearing strata. The lower series of these contains plants of Carboniferous age, but the higher coal-measures yield many plants of Mesozoic affinities. These strata have been invaded by igneous intrusions, and are to a great extent covered by Tertiary beds.

MINERALOGY AND PETROGRAPHY.[1]

Petrographical News.—A new type of rock has been discovered by Mr. Arnold Hague[2] in the Absaroka Range, Wyoming Territory. It was found as a boulder in the gorge of the Ishawooa River. The most striking feature of the rock is the number and size of the grains of fresh olivine scattered through it, the only other macroscopical ingredient being augite. These two minerals lie in a ground-mass composed principally of *leucite* and orthoclase, together with a small amount of plagioclase, magnetite, apatite, and minute flakes of brown mica. The rock is particularly interesting as the third occurrence of a leucite rock in North America. The leucite is partly idiomorphic and partly allotriomorphic. Some of its crystals are isotropic, while others show optical anomalies. A number contain minute augite grains as inclusions, arranged centrally or in a spherical zone about the centre of the crystal. An analysis of the rock reveals a very low percentage of potassium, a percentage so low as to suggest the existence of such conditions during the solidification of the rock as to allow of crystallization in two very distinct stages. The analysis was made by Mr. Whitfield.

SiO_2	TiO_2	Al_2O_3	Fe_2O_3	FeO	MnO	CaO	MgO	Na_2O	K_2O	Cl	P_2O_5	H_2O
47.28	.88	11.56	3.52	5.71	.13	9.20	13.17	2.73	2.17	.18	.59	2.96

——Two new localities for camptonite have been reported from the New England States within the past summer. The first is near Whitehall, Washington Co., N. Y., where Messrs. Kemp and Marsters[3] discovered dykes cutting the Georgia slates. In addition to the usual features of camptonite, the rock from this locality possesses porphyritic zonal augites with inclusions of brown hornblende crystals, similar to those constituting the most abundant constituent of the rock. The rock also possesses amygdaloidal cavities filled with calcite. The second locality is made known by Mr. F. L. Nason.[4] It is a rock-cut on the Rutland and Burlington R. R. near Summit, Vt. The rock is almost identical in appearance with dyke No. 2, of Dr. Hawes.[5]——Prof. F. D. Chester[6] regards the serpentine of Chester Co., Pa., as having been derived from a bronzite-diallage rock through the alteration of the bronzite to tremolite, upon its contact with a dark green hornblende. The original rock is of a slightly fibrous character, composed of a ground-mass of green hornblende, diallage, a little olivine and magnetite, in which are phenocrysts of bronzite prismatically elongated. This hornblende surrounds and includes the bronzite. In both minerals, as alteration has proceeded, the original characteristics gradually disappear, and in their place appear those of tremolite. Enstatite-gabbros and gabbro-diorites are also described. The latter rock is thought to owe its origin to the dynamic metamorphism[7] of the former. ——The rock occurring in eruptive bosses in northwestern New Jersey has been examined by Mr. Kemp[8] and found to correspond with Rosenbusch's biotite-augite-porphyrites. The plagioclastic ingredient is probably near anorthite in composition. The composition of the biotite is:

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[1] Edited by Dr. W. S. Bayley, Colby University, Waterville, Me.

[2] *Amer. Jour. Sci.*, July, 1889, p. 43.

[3] *American Geologist*, Aug. 1889, p. 97.

SiO_2	Al_2O_3	Fe_2O_3	CaO	MgO	K_2O	Na_2O	Loss.
34.61	15.74	8.52	tr.	20.03	17.14	tr.	2.8

Apatite is a very abundant constituent of all specimens.——The staurolite of a staurolite-mica-schist in the neighborhood of a mass of granitite, lying to the north of Saint-Étienne, France, is thought by Ternier[9] to be older than the metamorphic minerals found in the same rock. He believes it to be original, and in no way connected with the presence of the plutonic rock in its vicinity. Tourmaline in the same rock owes its presence to the influence of the granitite.

Mineralogical News.—Becker[10] proposes to simplify the view held as to the relations existing between the silicic acids found in silicates, by regarding meta-silicic acid as as a union of ortho- and poly-silicic acids ($H_4SiO_4 + H_4Si_3O_8 = 4H_2SiO_3$), and di-silicic acid as a poly-silicic acid from which ortho-silicic acid has been separated ($3H_4 Si_3O_8 — H_4 SiO_4 = 4H_2 Si_2O_5$). The advantages of this view, as suggested by the author, are found in the discussion of the decomposition of natural silicates, and in the study of isomorphism in long series of isomorphous substances like the feldspars, and in the di-morphism of many groups of silicates. The amphiboloids, for instance, being meta-silicates, their dimorphism may be explained by supposing the base in the one case to replace the hydrogen in the ortho-acid, while in the other it may be supposed to be united with the residue of the poly-acid. According to this view all silicates may be regarded as salts of ortho- or of poly-silicic acids or their combinations.——The iron sulphates of Chili are at present the subject of careful work by chemists in this country and abroad. The investigations of Frenzel[11] and G. Linck[12] have already been noticed. Recently Mackintosh[13] has published notes and analyses of *coquimbite*, *copiapite*, *roemerite*, *amarantite*, and a few other substances with apparently definite compositions. A pulverulent flaky orange-colored substance associated with copiapite and amarantite has a composition corresponding to $(FeO)Fe.(SO_4)_2 + 4H_2O$. White pulverulent decomposition products of the above mentioned minerals are basic iron sulphates and combinations of ferrous sulphate with the corresponding sodium compound. Among the minerals described by the author is one to which he has given the name *ferronatrite*. This mineral occurs in stellate groups of a pale green color, forming nearly spherical nodules, like wavellite. It is soluble in water, and has the composition:

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[4] *Amer. Jour. Sci.*, Sept. 1889. p. 229.

[5] Ib. CXVII, p. 147.

[6] 2d. Geol. Survey of Penna., Annual Rep. for 1887, p. 93.

[7] cf. AMER. NATURALIST, Dec. 1886, p. 1049.

[8] *Amer. Jour. Sci.*, Aug. 1889, p. 130.

[9] Bull. Soc. Franç. d. Min., XII., p. 393.

[10] *Amer. Jour. Sci.*, Aug. 1889, p. 154.

SO_3	Fe_2O_3	Al_2O_3	Na_2O	K_2O	SiO_2	H_2O
50.25	17.23	.43	18.34	.40	2.00	11.14

corresponding to $Na_3Fe(So_4)_3 + 3H_2O$. ——In the Archæan limestone of Macomb, St. Lawrence Co., N. Y., Mr. Kunz[14] has discovered a cave whose walls are lined with crystals of sea-green *fluorite*, forming groups weighing from ten to several hundred pounds. Attached to the fluorite are small masses of *lithomarge*, and imbedded in these are very perfect tetrahedral crystals of *chalcopyrite*. A water-worn fragment of *fire-opal* is mentioned by the same author as having been found in Crook Co., Oregon, and a *diamond* in Russell Co., Ky. The diamond weighs 7-16 carats. It was found on the top of a gravel hill, and is an elongated hexoctahedron, with rounded faces.—Almost all *epidote* crystals, as is well known, are elongated in the direction of their ortho-axes. Dr. Bodewig,[15] in America, and Artini, in Italy, have recently described crystals with a normal development, *i.e.*, with a prismatic habit, with the long direction parallel to the vertical axis. The American mineral was bought at the foot of Pike's Peak. The European specimen came from Elba.——Crystals of the hyacinth variety of *quartz*,[16] occurring in the saliferous clays in the Basses-Pyrénées district of France, contain numerous inclusions of *anhydrite* arranged zonally.——Both Rammelsberg[17] and Meyer[18] have concluded, as the result of independent chemical examination, that the substance described as *jadeite* by Fellenberg[19] is nothing more than *vesuvianite*.——As the result of a recalculation of the analyses found scattered through the literature of the natural sodium carbonates, and the light thrown upon these by some new analyses of salts produced by the solar evaporation of the waters of Owens Lake, Cal., Dr. Chatard[20] concludes that the substance known as *trona* ($Na_2CO_3 + 2\ NaHCO_3 + 3\ H_2O$) does not exist, either as a mineral or as an artificial compound, whereas all the published analyses of the natural carbonate, as well as those of the compound produced by artificial evaporation of mixed solutions of the carbonates, yield figures that correspond very closely with the composition of *urao*, a mineral described by Faxar,[21] and by Boussingault,[22] from Venezuela.——Bücking[23] has made a very thorough examination of the *glaserite*, *blödite* (*astrakanite*), *kainite*, and *boracite* crystals from the salt beds at Douglasshall, near Westeregeln, in the Stassfurt salt regions. The glaserite is in small, nearly colorless crystals, with a hardness of 2.75-3, and a specific gravity 2.632–2.656. They crystallize in the hexagonal system, with $a : c = 1 : 1.2879$, and usually have a rhombohedral symmetry, although individuals with an orthorhombic symmetry are not rare. Their refraction is positive with $\omega = 1.4907$ and $\epsilon = 1.4993$. Its composition corresponds approximately to the formula $3K_2SO_4 + Na_2SO_4$. The kainite is also in small crystals, with a cleavage parallel to $\infty P\bar{\infty}$. The axial ratio is $a : b : c = 1.2138 : 1 : 5862$. $\beta = 85^\circ$. The boracite is found in carnallite layers. It occurs in small colorless or light green crystals that are combinations of the cube and tetrahedron, with occasionally dodecahedral and other faces. The new planes

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[11] cf. AMER. NATURALIST, 1888, p. 1022.

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[13] *Amer. Jour. Sci.*, Sept. 1889, p. 242.

[14] *Amer. Jour. Sci.*, July 1889, p. 73.

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[15] *Amer. Jour. Sci.*, Aug. 1889, p. 164.

[16] Beaugey: Bull. de la Soc. Franç. de Min., XII., p. 396.

[17] *Neues Jahrbuch für Mineralogie, etc.*, 1889, I., p. 229.

[18] Ib. 1889, I., p. 270.

[19] cf. AMER. NATURALIST. March, 1889, p. 158.

[20] *Amer. Jour. Sci.*, July, 1889, p. 59.

[21] *Annals de Chemie*, II., II., p. 432.

[22] Ib. II., xxix., p. 110.

[23] *Zeits. für Kryst.*, xv., 6., p. 561.

$$\infty O 4, \left(\frac{4 O}{2}\right), - \left(\frac{\infty O}{2}\right) \text{ and } - \left(\frac{16 O}{2}\right)$$

were observed.

Rare Minerals.—*Mazapilite*, described by Dr. König,[24] proves[25] to be a calcium-iron arseniate, with the composition :

As_2O_5	Sb_2O_5	P_2O_5	Fe_2O_3	CaO	H_2O
43.60	.25	.14	30.53	14.82	9.83.

It crystallizes in the orthorhombic system, has a prismatic habit, and a specific gravity of 3.582.——*Uraninite.*—In a preliminary notice, Mr. Hillebrand[26] announces the presence of nitrogen in uraninite, in such combination as to yield the free gas upon treatment with an acid. He adds also that all specimens of this mineral examined, with the exception of one from Bohemia, are found to contain thoria or zirconia.——*Plattnerite*, the rare lead di-oxide, is described by Wheeler,[27] and by Messrs. J. D. and E. N. Hawkins[28] as occurring in a lead mine in Shoshone county, Idaho. The specimens examined are black. They have a hardness of 5–5.5, and a fusibility of 2. Analyses show that the mineral contains between 91 and 96.63 per cent. of PbO_2.——*Gyrolite* occurs as a colorless, fibrous layer lining the walls of an apophyllite vein at the New Almaden Quicksilver Mine, in California. Its composition, as determined by Prof. Clarke,[29] is :

SiO_2	Al_2O_3. Fe_2O_3	CaO	K_2O	Na_2O	F	H_2O
52.54	.71	29.97	1.56	.27	.65	14.60

[24] AMER. NATURALIST, Feb., 1889, p. 173.

[25] Proc. Acad. Nat. Sci., Phila., 45., 1888–9.

[26] *Amer. Jour. Sci.*, Oct., 1889, p. 329.

[27] *Amer. Jour. Sci.*, July, 1889, p. 79;

[28] ib., Aug., 1889, p. 165.

[29] *Amer. Jour. Sci.*, Aug., 1889, p. 128.